

Docket No. 99-038-TAP

CLAIMS:

What is claimed is:

1. A compact optical tracking system for magnetic tape,
comprising:

3 a magnetic head assembly;
4 a positioning actuator for changing the
5 position of the magnetic head assembly; and
6 an optical servo module structure for
7 outputting a position signal to the positioning
8 actuator, causing the positioning actuator to change
9 a position of the magnetic head assembly, wherein
10 the optical servo module structure comprises at
11 least one optical servo module, comprising:

12 an optical beam source for emitting an
13 optical beam,

14 a detector for detecting an optical beam
15 reflection; and

16 an optical beam interference composition
17 for interfering with the optical beam and
18 producing a predetermined pattern on a target.

1 2. The compact optical tracking system recited in claim
2 1, wherein each optical servo module contains at least a
3 first and second detector for detecting an optical beam
4 reflection.

1 3. The compact optical tracking system recited in claim
2 2, wherein the magnetic head assembly comprises a read

3 and a write head, and the optical servo module structure
4 is affixed to the magnetic head assembly between the read
5 and write heads, and the optical servo module structure
6 faces a front side of the magnetic tape.

1 4. The compact optical tracking system recited in claim
2 2, wherein the optical servo module structure comprises a
3 plurality of optical servo modules.

1 5. The compact optical tracking system recited in claim
2 4, wherein the optical servo module structure is affixed
3 to a side of the magnetic head assembly and oriented to
4 an angle of tape wrap of the magnetic tape.

1 6. The compact optical tracking system recited in claim
2 4, further comprising:

3 a yoke assembly, wherein the optical servo
4 module structure is affixed to a yoke assembly, and
5 the optical servo module structure faces a back side
6 of the magnetic tape.

1 7. The compact optical tracking system recited in claim
2 6, further comprising:

3 a grating assembly, wherein the grating
4 assembly comprises at least one reference grating
5 used as a target for the predetermined pattern
6 emitted from the optical source within the optical
7 servo module.

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1 8. The compact optical tracking system recited in claim
2 7, further comprising:

3 an outboard reference grating on the grating
4 assembly, wherein the outboard reference grating is
5 affixed to the grating assembly past the extent of
6 the magnetic tape; and

7 an outboard servo module, wherein the
8 predetermined pattern emitted from the optical
9 source within the outboard servo module uses the
10 outboard reference grating as a target.

1 9. The compact optical tracking system recited in claim
2 8, wherein the positioning actuator is configured between
3 the yoke assembly and the magnetic head assembly, and
4 wherein only the magnetic head assembly is moved by the
5 positioning actuator.

1 10. The compact optical tracking system recited in claim
2 8, wherein the positioning actuator is configured
3 adjacent to both the yoke assembly and the magnetic head
4 assembly, wherein the yoke assembly and the magnetic head
5 assembly are moved by the positioning actuator.

1 11. The compact optical tracking system recited in claim
2 8, wherein one of the reference grating and outboard
3 reference grating contain a reference index on the
4 reference grating.

1 12. The compact optical tracking system recited in claim
2 8, wherein the grating assembly is affixed to the
3 magnetic head assembly between the read and write heads.

1 13. The compact optical tracking system recited in claim
2 8, wherein the outboard reference grating is affixed
3 adjacent to one of the read and write heads.

1 14. The compact optical tracking system recited in claim
2 8, further comprising:

3 a fine positioning actuator for adjusting the
4 magnetic head assembly relative to one of the
5 reference grating and the outboard reference
6 grating.

1 15. The compact optical tracking system recited in claim
2 11, further comprising:

3 a fine positioning actuator for adjusting the
4 magnetic head assembly relative to the reference
5 index on one of the reference grating and the
6 outboard reference grating.

1 16. The compact optical tracking system recited in claim
2 8, further comprising:

3 a linear actuator for loading magnetic tape
4 onto the magnetic head assembly.

1 17. The compact optical tracking system recited in claim
2 8, further comprising:

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3 a rotary actuator for loading magnetic tape
4 onto the magnetic head assembly.

1 19. The compact optical tracking system recited in claim
2 4, wherein the optical beam interference composition is a
3 hologram.

1 21. A compact optical tracking system for magnetic tape,
2 comprising:

3 a magnet head assembly comprising:
4 a magnetic head and
5 an optical servo module structure for
6 outputting a position signal to the positioning
7 actuator, causing the positioning actuator to
8 change a position of the magnetic head
9 assembly, wherein the optical servo module
10 structure comprises at least one optical servo
11 module, each comprising:
12 an optical beam source for emitting
13 an optical beam;
14 a detector for detecting an optical
15 beam reflection; and

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16 an optical beam interference
17 composition for interfering with the
18 optical beam and producing a predetermined
19 pattern on a target.

1 22. The compact optical tracking system recited in claim
2 21, wherein the optical servo module structure is affixed
3 to a side of the magnetic head assembly and oriented to
4 an angle of tape wrap of the magnetic tape.

23. The compact optical tracking system recited in claim 21, wherein the magnetic head further includes a read head section and a write head section and a cavity between the read head section and the write head section, wherein the optical servo module structure is positioned in the cavity between the read head section and the write head section.

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